SLOVENSKI STANDARD
SIST EN 15723:2011

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Železniške naprave - Zapiralne in varovalne naprave za zaščito pred okoljskimi vplivi - Zahteve, ki se nanašajo na trajnost, obratovanje, označevanje, vzdrževanje in predelavo

Railway applications - Closing and locking devices for payload protecting devices against environmental influences - Requirements for durability, operation, indication, maintenance, recycling

Bahnanwendungen - Verschluss- und Sicherungsteile von Ladegutschutzeinrichtungen gegen Umwelteinflüsse - Anforderungen an Festigkeit, Bedienbarkeit, Kennzeichnung, Instandhaltung, Entsorgung

Applications ferroviaires - Dispositifs de fermeture et de verrouillage des équipements de protection du chargement contre les influences environnantes - Exigences de résistance mécanique, exploitation, marquage, maintenance et recyclage

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45.060.01	Železniška vozila na splošno	Railway rolling stock in general

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Contents

Page

Foreword

This document (EN 15723:2010) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2010, and conflicting national standards shall be withdrawn at the latest by July 2010.

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For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

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Introduction

To achieve an undisturbed, reliable and safe operation of freight trains it is essential to define common requirements for closing and locking devices of protecting devices of interoperable trains with respect to e.g. structural requirements, operating characteristics, way of operation, maintenance as well as their handling.

1 Scope

This European Standard applies to new and upgraded freight wagons where an approval is required. These protecting devices are classified into two types of load and this standard defines the requirements for the durability of the closing and locking devices, their status indication, maintenance and recycling. This standard also defines pass-fail criteria for the dimensioning tests.

NOTE Provisions going beyond the scope of these requirements should be agreed by the contracting parties involved.

This standard is not applicable to closing and locking devices which are used to ensure a pressure difference or to retain liquids /liquid payloads. It is not applicable to vehicles which are emptied by pressure, nor is it applicable to loose tarpaulins.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 349, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

prEN 12663-2, *Railway applications — Structural requirements of railway vehicle bodies — Part 2: Freight wagons*

prEN 15877-1, *Railway applications — Marking on railway vehicles — Part 1: Freight wagons*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
aerodynamic forces
forces affecting the vehicle and component assemblies by an air stream

3.2
forces from selfmass
inertia forces resulting from dynamic forces applied to the protecting (locking) devices

3.3
unloading door
type of door which is subject to the force of the payload (or a proportion of it)

NOTE The door should be able to be secured against un-planned opening (Category 2).

3.4
movable device to protect
device to protect payload against environmental influences and exterior forces

NOTE 1 Loose tarpaulins are not considered as a movable protecting device.

EXAMPLES Sliding walls, flaps, rigid sliding hoods and covers, hinged doors, bottom doors.

3.5
closing and locking device
device for fixing a movable protecting device in a defined position

3.6
operating module
freight wagon load securing or locking unit activated by operating elements

NOTE An operating module can also be an operating element.

3.7
operating element
element which is operated during loading/unloading

EXAMPLES Removable stanchions, hand wheels, sliding walls, levers or movable tie-downs.

3.8
applied force or moment
body force or moment which acts outwardly from the body

NOTE 1 Applied forces or moments are operating forces.

NOTE 2 In order to activate an operating element, both static and dynamic forces are applied.

3.9
percentile
statement on how many participants of the test group (in percent) are able to summon up the applied force or applied moment

NOTE 1 The applied forces or moments stated in the standards always refer to certain percentiles of the test group.

NOTE 2 Typical values of percentiles are 1, 5, 15, 50 or 95. Here the difference between 100 and the percentile value describes the percentage of the test group, which is able to summon up more than the respective applied force or moment. When stating the 85th percentile this means for instance that 85 % of the test persons are able to carry out the described activity – and 15 % will be able to carry out more than the described activity. When stating the 15th percentile this means for instance that 15 % of the test persons are not able to carry out the described activity – and 85 % will be able to carry out the described activity.

3.10
types of load
classification in two types of loads which are considered for the design of closing and locking devices

NOTE 1 These loads are either internal forces from the load itself or external forces during travelling.

NOTE 2 Examples for when these loads are considered for different door types are shown in Table 1.

3.11
automatic safety device
automatic device that prevents danger from wrong operation to and by the user

3.12
safeguard device
device that safely locks the movable items in their defined (open, close intermediate) position preventing unintentional movements

Table 1 — Types of load

	Load types		
Type of door	**Category 1** **Planned/accepted forces by payload (even unloading by gravity), dynamic forces from payload (including unloading)**	**Category 2** **No forces from payload, dynamic forces from exterior forces only**	**Examples of types**
Doors, discharge	X	X	Tanoos, Fals HAA, HHA CDA
Sliding walls	X	X	Hbi... wagons VGA
Sliding covers/hoods		X	Shimms Rils
Hinged side doors/ end doors	X	X	E-wagons
Curtain sides		X	
Hoppers with opening roof		X	Tamns
Siding roof "spread eagles"	X	X	

4 Requirements

4.1 General

Doors and hatches of freight vehicles shall be designed to be closed and locked. This remains valid while the vehicles are in a moving train (unless this is part of the procedure for discharging the payload). Wagons fitted with special equipment (automatic discharging, opening roof, etc.) shall have instructions concerning operation of this equipment and the safety precautions to be taken, placed in a prominent position and if possible in several languages; these instructions may be accompanied by appropriate pictograms.

The closing and locking devices shall be designed to withstand the loads which are caused by the payload under normal, regular conditions and when the payload has been displaced in a foreseeable manner (see Table 1, Category 1).

The closing and locking devices shall be designed to withstand the loads which could effect to vehicles during operation.

The side doors and the shutters of the ventilation apertures of covered wagons shall be designed to prevent wear and in service stresses causing deformation and resulting in these elements being ripped or falling off during the shunting process or while the train is moving (particularly during passing of two trains).

For all types of covered wagon with sliding side doors, they shall be equipped with suitably dimensioned devices to prevent any unintended disengagement. The devices shall limit the vertical play and shall take effect in any operating condition.

The forces, which are needed to actuate the closing and locking devices, shall be of a magnitude that can be applied by an operator without additional tools. Exceptions are allowable when additional tools are specifically made available or when motor driven systems are used.

For this, locking devices shall be used which indicate their status (open/closed) and they shall be visible by an operator outside the train.

4.2 Strength of side doors and their locking devices, sliding doors and single and multi-leafed doors under transverse loading

The doors and their locking devices, when closed and locked, shall withstand a horizontal normal force from the inside of the wagon outwards, representing the forces produced by a shift in the load as well as by aerodynamic forces during operation.

No permanent deformation or loss of functionality should occur, either on the door itself (wall and framework) or on the locking, sliding or guiding components as a result of these loads except where other pass-fail-criteria are defined.

The load cases are shown in Annex A.

4.3 Strength of sliding walls and their locking devices

The sliding walls and their locking devices, when closed and locked, should resist a horizontal cross force applied from the inside of the wagon outwards. This force represents the forces produced by a shift of the load as well as by pressure differences resulting from aerodynamic forces during operation.

The load cases and pass-fail criteria are shown in A.2.

4.4 Forces resulting from the passing of trains

4.4.1 General

Locking devices shall maintain their functionality.

The load cases and pass-fail criteria are shown in A.3.

4.4.2 Movable roofs

Movable roofs and their closing and locking devices at least shall meet the requirements as shown in Table 1, Category 2.

The load cases and pass-fail criteria are shown in A.4.

4.4.3 Side doors of high-sided open wagons and their closing and locking devices

The side doors and their closing and locking devices shall maintain their functionality.

The load cases and pass-fail criteria are shown in A.5.

4.4.4 Unloading doors of gravity discharge wagons and their closing and locking devices

Strength of walls

The walls should sustain the maximum permissible loads due to the goods they are intended to carry.

The closing and locking devices shall maintain their functionality when they withstand the maximum permissible load, according to the requirements of 4.2.

According to 4.2.

The manual forces, which are needed to actuate the closing and locking devices, shall be of a magnitude that can be applied by an operator without additional tools. Exceptions are allowable when additional tools are specifically made available or when motor driven systems are used.

The requirements of EN 349 apply.

Guidance concerning the determination of the maximum permissible manual forces is defined in Annex B and Annex C.

4.5 Safeguards of movable protecting devices (i.e. doors, sliding walls, sliding roofs, flaps, hoods)

Movable items shall be provided with automatic safety devices to avoid any wrong movement in the course of opening and closing operations.

Movable items, (i.e. doors, walls, roofs) shall be designed to be secured against unintentional movement when placed in their defined position (open, close intermediate) by safeguard devices which shall work automatically.

The final positions are to be fitted with fixed stops.

Movable items shall be secured positively in their final closing position against unintentional opening by forces from inside the loading space or exterior forces.

Locking devices shall be used whose status (open/closed) is recognisable. Locking devices shall indicate their status in a way that can be checked from outside of the wagon.

The locking devices shall be designed to be secured against unintentional opening during running.

4.6 Verification of durability and functioning

Verification of durability for the locking and closing devices of movable protecting devices of Category 1 (see Table 1) is made according to the respective loads to be determined in as far as the load cases set out in Annex A do not apply.

Verification of durability and functioning for locking and closing devices of movable protecting devices of Category 2 (see Table 1) is made by means of suitable measures. These can be, for example, analogy considerations concerning service-proven design solutions, computational demonstration of durability or tests.

4.7 Instructions for use

Suitable and clear instructions for use shall be applied near each locking device and shall be visible by the operator.

The wagon shall bear inscriptions in one or more languages or pictograms showing the relevant information for safe operation.

Specifications regarding the information and pictograms are defined in prEN 15877-1.

4.8 Environmental conditions

The closing and locking devices shall fulfil as a minimum the environmental conditions applicable to the complete wagon.

4.9 Recycling

The closing and locking devices shall be designed to maximise the use of recyclable materials.

5 Maintenance/repair

Wear, failures and other damage may influence the operational safety of railway vehicles. Depending on the wear behaviour, the utilization parameters and the current condition of the railway vehicles, a maintenance system shall be set up to ensure that the safe functional performance is always achieved. This shall be included in the vehicle maintenance documentation.

The closing and locking systems shall be inspected at defined maintenance periods and remedial action taken if signs of damage or malfunction are found.

Areas subject to wear shall be accessible for inspection and repair.

Documentation shall be provided on the areas to be inspected and the intervals of inspection.